

(12) INTERNATIONAL APPLICATION PUBLISHED UNDER THE PATENT COOPERATION TREATY (PCT)

(19) World Intellectual Property
Organization
International Bureau



(43) International Publication Date
29 April 2004 (29.04.2004)

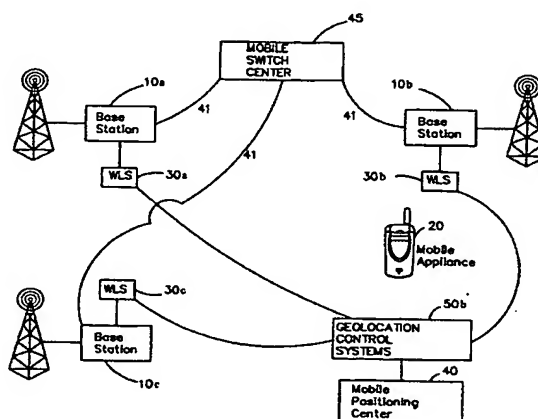
PCT

(10) International Publication Number
WO 2004/036935 A1

- (51) International Patent Classification⁷: **H04Q 7/20**
- (21) International Application Number: **PCT/US2003/032579**
- (22) International Filing Date: 16 October 2003 (16.10.2003)
- (25) Filing Language: English
- (26) Publication Language: English
- (30) Priority Data:
60/418,342 16 October 2002 (16.10.2002) US
- (71) Applicant (for all designated States except US): **ANDREW CORPORATION** [US/US]; 13595 Dulles Technology Drive, Suite 200, Herndon, VA 20171 (US).
- (72) Inventors; and
- (75) Inventors/Applicants (for US only): **KENNEDY, Joseph, P., Jr.** [US/US]; 11127 Elmview Place, Great Falls, VA 22066 (US); **CARLSON, John, P.** [US/US]; 12006 Trossack Road, Herndon, VA 20170 (US); **GRAVELY, Thomas, B.** [US/US]; 11693 Hanna Overlook Court, Herndon, VA 20170 (US); **BRICKHOUSE, Bob** [US/US]; 11432 Summerhouse Court, Reston, VA 20194 (US).
- (81) Designated States (*national*): AE, AG, AL, AM, AT, AU, AZ, BA, BB, BG, BR, BY, BZ, CA, CH, CN, CO, CR, CU, CZ, DE, DK, DM, DZ, EC, EE, ES, FI, GB, GD, GE, GH, GM, HR, HU, ID, IL, IN, IS, JP, KE, KG, KP, KR, KZ, LC, LK, LR, LS, LT, LU, LV, MA, MD, MG, MK, MN, MW, MX, MZ, NI, NO, NZ, OM, PG, PH, PL, PT, RO, RU, SC, SD, SE, SG, SK, SL, SY, TJ, TM, TN, TR, TT, TZ, UA, UG, US, UZ, VC, VN, YU, ZA, ZM, ZW.
- (84) Designated States (*regional*): ARIPO patent (GH, GM, KE, LS, MW, MZ, SD, SL, SZ, TZ, UG, ZM, ZW), Eurasian patent (AM, AZ, BY, KG, KZ, MD, RU, TJ, TM), European patent (AT, BE, BG, CH, CY, CZ, DE, DK, EE, ES, FI, FR, GB, GR, HU, IE, IT, LU, MC, NL, PT, RO, SE, SI, SK, TR), OAPI patent (BF, BJ, CF, CG, CI, CM, GA, GN, GQ, GW, ML, MR, NE, SN, TD, TG).
- Published:**
- with international search report
 - before the expiration of the time limit for amending the claims and to be republished in the event of receipt of amendments

[Continued on next page]

(54) Title: NETWORK OVERLAY LOCATION SYSTEM AND METHOD FOR AIR INTERFACE WITH FREQUENCY HOPPING



(57) Abstract: Embodiments of a system and method are disclosed that enable geo-location of a mobile appliance (20) communicating over a frequency hopping air interface for a network overlay geolocation system having plural wireless location sensors (30). The wireless location sensors (30) include a radio receiver channel capable of receiving the forward channels of the air interface transmitted from the base station (10) to the mobile appliance (20). The network overlay geo-location system of the present disclosure monitors these forward channels and measures parameters that allow the geolocation system to synchronize with the hopping of the air interface on the reverse channel. The plurality of sensors measure an attribute of a signal on the reverse channel to thereby enable geo-location. Synchronization can also be reference to a stable system clock and the plurality of sensors may be tuned in reference to the system clock to enable measurement of the frequency hopping reverse channel.

WO 2004/036935 A1



For two-letter codes and other abbreviations, refer to the "Guidance Notes on Codes and Abbreviations" appearing at the beginning of each regular issue of the PCT Gazette.

INTERNATIONAL SEARCH REPORT

International application No.

PCT/US03/32579

A. CLASSIFICATION OF SUBJECT MATTER

IPC(7) : H04Q 7/20

US CL : 455/456.1

According to International Patent Classification (IPC) or to both national classification and IPC

B. FIELDS SEARCHED

Minimum documentation searched (classification system followed by classification symbols)

U.S. : Please See Continuation Sheet

Documentation searched other than minimum documentation to the extent that such documents are included in the fields searched

Electronic data base consulted during the international search (name of data base and, where practicable, search terms used)
EAST

C. DOCUMENTS CONSIDERED TO BE RELEVANT

Category *	Citation of document, with indication, where appropriate, of the relevant passages	Relevant to claim No.
Y	US 6,295,455 B1 (FISCHER et al.) 25 September 2001 (25.09.2001) Figures 1 and 4 and starting column 5, line 28 and ending column 6, line 61; column 10, lines 39 -57	1-27
Y	US 6,334,059 B1 (STILP et al.) 25 December 2001 (25.12.2001) starting column 9, line 47 and ending column 10, line 27	1-27
Y	US 2002/0039904 A1 (ANDERSON et al.) 04 April 2002 (04.04.2002) paragraphs 00017, 0062 -0065, 0074, 0077 -0081	1-27
A	US 6,188,351 B1 (BLOEBAUM) 13 February 2001 (13.02.2001) starting column 3, line 54 and ending column 5, line 35	1,2,9,18,23,27
A	US 5,506,863 A (MEIDAN) 09 April 1996 (09.04.1996) starting column 3 line 63 and ending column 4, line 63	1,2 -4, 9 -13,18,23,27

☐ Further documents are listed in the continuation of Box C.

☐ See patent family annex.

* Special categories of cited documents:

"A" document defining the general state of the art which is not considered to be of particular relevance

"E" earlier application or patent published on or after the international filing date

"L" document which may throw doubts on priority claim(s) or which is cited to establish the publication date of another citation or other special reason (as specified)

"O" document referring to an oral disclosure, use, exhibition or other means

"P" document published prior to the international filing date but later than the priority date claimed

"T"

later document published after the international filing date or priority date and not in conflict with the application but cited to understand the principle or theory underlying the invention

"X"

document of particular relevance; the claimed invention cannot be considered novel or cannot be considered to involve an inventive step when the document is taken alone

"Y"

document of particular relevance; the claimed invention cannot be considered to involve an inventive step when the document is combined with one or more other such documents, such combination being obvious to a person skilled in the art

"&"

document member of the same patent family

Date of the actual completion of the international search

25 February 2004 (25.02.2004)

Date of mailing of the international search report

10 MAR 2004

Name and mailing address of the ISA/US

Mail Stop PCT, Attn: ISA/US
Commissioner for Patents
P.O. Box 1450
Alexandria, Virginia 22313-1450

Facsimile No. (703)305-3230

Authorized officer

Tanmay Lele

Telephone No. (703) 305-3444

Rudolf Zogor

INTERNATIONAL SEARCH REPORT

PCT/US03/32579

Continuation of B. FIELDS SEARCHED Item 1:

455/456.1; 404.1,404.2,422.1,423,424,426.1,435.1,456.1,456.2,456.3,456.4,456.5,456.6,502,515,516,517;
342/357.01,357.06,357.07,357.08,357.09,357.1,357.11,357.12; 370/350,347,337,321;
375/132,134,133,135,136,137,138,139,354,356,358,360,365